DOCUMENT RESUME

ED 053 773 LI 003 045

AUTHOR	Shank, Russell; And Others
TITLE	A Library Network for Western Canada; Automation for Rationalization in College and University Libraries in Alberta, Saskatchewan and Manitoba.
INSTITUTION	Kent State Univ., Ohio. Center for Library Studies.
PUB DATE	Feb 71
NOTE	78p.; (0 References)
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	*Computers, Information Services, *Information Systems, *Library Automation, *Library Networks, Library Services, *University Libraries
IDENTIFIERS	Alberta, *Canada, Manitoba, Saskatchewan

ABSTRACT

The recommendations of this study are: (1) The western provinces of Canada should move toward making available to the university libraries of the region, the prospective benefits of a magasystem organization during the next ten years. (2) There is no present need or justification for mounting an immediate crash program to create the computer-based subsystem. (3) Immediate work is fully justified toward clarification of the design elements, systems of governance, and essential limitations of the presumed resource-management subsystems. (4) As a necessary accessory to the previous recommendations, each university should develop internally and formalize at its highest levels a clear and detailed statement of the quality levels it requires for library and related informational services. (Author/MM)

Kent State University

February, 1971

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

A LIBRARY NETWORK FOR WESTERN CANADA

Automation for Rationalization in College and University Libraries in Alberta, Saskatchewan and Manitoba

Revision of the March, 1970 report entitled: "Automation for Rationalization in College and University Libraries in Alberta, Saskatchewan and Manitoba" with appendices and additional documentation

Report and Recommendations to
The Interprovincial Committee on University Rationalization
by a select study team

Russell Shank, Chairman
C. Dake Gull
Edward Heiliger
Duncan Wall, Project Editor

KENT CENTER FOR LIBRARY STUDIES
Kent State University
February, 1971

LI 00 3.045

Best Copy Available

SUMMARY LIST OF PROJECT DOCUMENTATION

REPRISE OF THE RECOMMENDATIONS AND FINDINGS OF THE PROJECT DOCUMENTATION pp. 1-8

THE MAJOR STUDY REPORT OF MARCH, 1970

Introduction and background pp. 10-12

I. The System Concept pp. 13-20

II. Program for Action

Checklist of priority tasks pp. 21-23

Recommended interim program

Continuing support of local programs pp. 23-24

Priority for record conversion pp. 24-28

Establishment of a systems office pp. 28-30

Interaction with outside agencies pp. 31-32

APPENDICES TO THE STUDY REPORT

A: Campus Visit Assignments pp. 34

B: Comment on the Gross Proposal pp. 35-36

C: Correspondence initiating the study, etc. pp. 37-53

D: Comparative Costs of Library Network Projects pp. 54-70

E: List of desirable products and services from the joint automated system of the three national libraries and compatibility problems associated with each pp. 71

F: Communications Costs and Design in the Megasystem pp. 72-76

REPRISE OF RECOMMENDATIONS AND CONCLUSIONS

Prefatory Note on the Purpose of This Restatement

The work of the Center for IPCUR, at the time this restatement was drawn up, had extended over 16 months and resulted in a complex mass of documentation, drafted by a number of different individuals at different points in the study.

Much of this documentation, including the report of March, 1970, was prepared by the study team during that primary phase of the study. Another substantial part consisted of correspondence, preliminary reports, interpersonal memoranda, and briefs submitted by individual members of the team on particular points of inquiry.

The re-examination of certain matters following the submission of the team report, undertaken at IPCUR's request, involved both cost analyses and transitional questions intended to link together more clearly documents originally written separately. This work was done for the Center by individual associates after the study team had ceased its work. It has not been presented previously.

At the same time, as noted elsewhere in this document, a few emendations as observed necessary have been made in the text of the major report of the study team submitted in March, 1970. A new heading structure has also been emphasized to simplify the reading of the text. In a few places some transitional or background material omitted in the text of the draft of the March report has

been resupplied.

The slight recasting of the text of the March report which these changes effect is not intended in any way to alter or withdraw the conclusions or recommendations advanced by the study team. It is intended merely to make a fresh statement of these conclusions, which we hope in good-will to be somewhat more accessible to the readers of the report, either because of their own preconceptions, or because of the necessary haste with which that text was drawn up.

REPRISE OF RECOMMENDATIONS AND CONCLUSIONS OF THE STUDY DOCUMENTATION

The fundamental concept that the study team was asked to appraise appears to be a very simple one, and is worth restating briefly here. It involves the creation of a large computer-based library data system replacing all or most of the existing catalog and other data systems now used by the university libraries of the provinces. The creation of this powerful data system, which would be available via inquiry terminals to users of the system on all campuses, would in turn lead to striking opportunities to improve the performance of the libraries, and particularly the efficiency of the staff activities connected with book processing. At the same time, a system of rapid inter-campus delivery by physical and facsimile methods would be created, and the operation of these, together with the computer-based catalog system, would permit the university libraries collectively to reduce the presumed excessive redundancy which would characterize their collections at that point. The cost of the creation and operation of the system overall is presumed by its advocates to be amply returned by theoretical savings in staff salaries, book storage space, reduction of unnecessary duplication, and other efficiencies.

There is very little that is particularly novel about the concept. It is quite familiar to anyone with any real experience in library development or library automation

work. The library community has in fact been moving down the road to the creation of such systems with deliberate and steady pace for a number of years. The striking advances in both the effectiveness and efficiency of library service through the creation of such a megasystem are clearly sufficient to repay the expenditure of large sums of money and the best thinking of a generation.

At the same time, it must be quite clear that what we are talking about here is not a single system with some profitable fallout, but a whole collection of systems, each quite substantial, each required to operate effectively on a dozen campuses, each involving stunning changes in the organization of an enterprise which is intimately associated with a part of university life of the utmost centrality to the unique function of a university. What we are talking about here is not a system but a megasystem, with all the distinct capacity for a frightening mutation into a monster system.

Under such striking circumstances, it is particularly disturbing to find the discussion leading to the development decision being carried out chiefly under the animation of proposals and counterproposals from computer companies and other individuals who have little concern or responsibility for either the significance of the changes they propose, and who confuse the question of the megasystem in a rather juvenile manner with the creation of the computer-based data

system, its principal component subsystem. Thus system concepts which are ripe for development in Ohio or Ontario or Ottawa or Washington in 1968 are transferred artificially to Western Canada without any real appreciation of the very real differences in technical or economic payoffs available in the region in 1969. This is silly business.

The experience so far with the development of such systems, and particularly with the key computer-based library data subsystem, has indicated rather clearly that the development process is slow, complex and expensive. We have taken the trouble to gather together in an appendix to this report, some of the representative cost experience of some similar projects. None of these projects is yet within several years of sighting any kind of net return from the project, and there is no certainty that any of them ever will find such a happy result. Clearly a mechanical mimicking of these projects animated either by a desire to be fashionable or the pursuit of imaginary savings would be an ineffective way of achieving the real promise of the megasystem configuration. What is required is a stable, continuing, well-conceived development program working from the base of a competent staff dedicated to the long haul toward the megasystem. Anything less will result in a series of marches and countermarches of little real effect.

RECOMMENDATION ONE. The western provinces of Canada, acting through IPCUR or some other suitable instrument, should move toward making available to the university libraries of the

region, during the next ten years, the prospective benefits of a megasystem organization. An essential element in the ability to use megasystem organization will inevitably be the acquisition of the services of a thoroughly modern computer-based library data system.

RECOMMENDATION TWO. There is no present need or justification for mounting an immediate crash program to create the computer-based data subsystem. The western provinces should direct their development effort so far as this subsystem is concerned, for the next several years, to the measured evolution of a systems plan. The development of this systems plan will require a small staff of highly competent people with adequate quarters and travel funds. Activities of the staff would properly include technical monitoring of other automation programs both inside and outside the region, the negotiation of long-lead-time components of the systems plan with the member universities, funding of certain types of activities at university libraries (e.g., supplying the extra funds sometimes required to allow a data conversion to use a general-purpose data format) and other activities. It is at least conceivable that the result of the work of this staff will be to acquire the services of a computer-based subsystem operated outside the region, accessed by extensive telecommunications networks.

RECOMMENDATION THREE. Immediate work is fully justified toward clarification of the design elements, systems of

governance, and essential limitations of the presumed resource-management subsystem. This work should begin soon at a technical level with substantial commitment of manpower, preferably through a central organization with no special commitment to a particular institution or province. Academic planning is still in its adolescence at the institutional level, and at the inter-institutional level has almost no substantial successes to show. The present project presumes successful academic planning at the inter-provincial level. Under such circumstances, it will be absolutely essential for the universities to have a clear and detailed picture of what efficiencies can really be translated into the library system as the result of academic planning. At present, there is a rather naive tendency to believe that academic specialization itself can be carried off and that it can be translated rather directly into a static pattern of library specialization. This simplistic view is in no way justified by the behavior of the real men who would use the system, and it certainly is out of gear with certain fundamental problems in library management. In any case, if the megasystem is ever to be created anywhere but on paper, the universities will require a very much more specific picture of the library requirement which result from academic programs than has been attained at present.

RECOMMENDATION FOUR. As a necessary accessory to the previous recommendation, each university should develop intern-

ally and formalize at its highest levels a clear and detailed statement of the quality levels it requires for library and related informational services. At present, a persistent misunderstanding of the quality and extent of collections and services required for academic work, and specifically the support of faculty and graduate research, makes it impossible to establish and maintain a sufficiently detailed local statement of requirements. Techniques used by the universities in the development and formalization of such a statement could vary widely, but the task is of sufficient importance and difficulty to occupy, for instance a mixed team on a part-time basis at each university for two years. Such study teams might be composed of several different kinds of individuals, including one or two librarians, a computer scientist with particular skills in system design of data base oriented systems, an economist, a historian or literary scholar, a physical scientist, and a sociologist or political scientist. These suggested team members are named not so much for representative purposes, but because of particular skills necessary to the task.

AUTOMATION FOR RATIONALIZATION IN COLLEGE AND UNIVERSITY LIBRARIES IN ALBERTA, SASKATCHEWAN AND MANITOBA

REPORT AND RECOMMENDATIONS

By

Russell Shank, Chairman
C. Dake Cull
Edward Heiliger
Duncan Wall

Prepared for the Interprovincial

Committee on University Rationalization

Kent State University, Kent Center for Library Studies

March, 1970

INTRODUCTION AND BACKGROUND

This report is responsive to a letter of June 13, 1969 from Principal W. A. Riddell, University of Saskatchewan Regina Campus, to Mr. H. Duncan Wall, Assistant Director of Libraries for Planning and Development, Kent State University Kent, Ohio. In the letter Principal Riddell stated that the general objectives of the study would:

> ...fall within the broad aim of IRCUR's interest in libraries, i.e. the rationalization of library development. The Project would investigate co-operative automated systems: 1. As one means of guiding collection development, 2. As increasing the sharing of library resources, 3. as providing better library services at the same or lower cost than could be otherwise achieved, 4. in relation to national computerized catalogues and other computerized services being planned by the national libraries, 5. in relation to other co-operative systems and projects being planned on a regional, national or international basis.

Mr. Wall, unable because of previous committments to attempt the study by himself, referred this inquiry to Professor Edward M. Heiliger, Director of the Kent Center for Library Studies. They made a counterproposal to Riddell based upon a team effort with themselves as members and selecting from the Centers panel of available consultants Mr. Cloyd Dake Gull, President of Gull & Associates, and Dr. Russell Shank, Director of the Libraries of the Smithsonian Institution. Dr. Shank was later elected by the team as chairman of the study phase of the project.

The project began some months later than expected because of delays in the authorization and funding of the study

by IPCUR.

The team visited the campuses of IPCUR members and of several British Columbia universities late in 1969, and talked with their librarians, computer center personnel and some of the principal administrative officers. Several of the team members met with Canadian librarians at the national meetings of the American Society for Information Science in San Francisco in October, 1969 and the American Library Association in Chicago in January, 1970. Throughout these meetings and discussions all of the individuals visited were extremely cordial and cooperative and made every effort to provide the team members with information relevant to the objectives of the project.

The team members were well aware that the university libraries of Canada had been surveyed several times in the last twenty years. We knew that the collections have grown considerably in strength as a result of these successive surveys, but that the demands and expressed and evident needs for library service still exceed the capabilities of the combined libraries to serve their users adequately. The team is particularly aware of accomplishments toward automation in the University of British Columbia and Simon Fraser University in British Columbia, of the substantial plans for improving information services set forth at the University of Calgary, of the active interest of Commission VIII, Library Resources

and Automation, of the Association of Universities and Colleges of Canada, of the activities of the Canadian Association of College and University Libraries, of the more recent development of the Council of Western College and University Librarians, and of the substantial study conducted by Mr. J. P. I. Tyas and his colleagues as part of the series of Science Council Studies.

This team's project is also traceable to an offer from IBM Canada to the University of Saskatchewan to participate in a joint study with an IPCUR Study Group concerning a shared library automated system, and by the subsequent observations of the chief librarians of the eleven provincial universities of the western provinces on this offer on October 25, 1968. This report addresses itself in part to that specific proposal.

An extremely pertinent, and also recent, declaration bearing on this Project is the "A Co-operative Acquisitions Plan for Canada" by Guy Sylvestre, the National Librarian of Canada, presented at the Commission on Library Co-ordination, Annual Meeting of the Association of Universities and Colleges of Canada, at Ottawa, November 5, 1969.

I. THE SYSTEM CONCEPT

In a study of this kind, careful definition of system goals and system concepts is essential, and usually considerably more difficult than originally envisioned by those animating the study. In the present study, the separation of goals from presumed methods proved to be a substantial complexity.

The team has continuously attempted to define the system goals that the IPCUR representatives might have in mind, even vaguely, which could serve as a focus for our critique and advice. Our experience suggests that the following system definition is implicit in the 1968 IBM proposal and the comments elicited from IPCUR representatives during interviews. It seemed to us that IPCUR holds as its goal a coordinated and cooperative information system for its members, incorporating the information resources commonly found in libraries and information centers. The system would make use of traditional library and information center techniques, facilitated or supplanted by the rapid automated operations permitted by the use of electronic computers and peripheral equipment, and linking the several activities in their various locations by means of telecommunication circuits. The aim of the system would be to deliver information to users with the shortest practical delay. It is assumed that this system would permit the rationalization of the information collections by tending

to reduce the duplication of holdings among the campus by substantially improving the rapid and easy provision of information at present or reduced expenditures.

The system concept so defined is not a particularly novel one. The system concept itself in reasonably similar forms is at least a decade old, and projects directed toward the realization of such a network are actually under way at more than a dozen places in North America alone.

We believe that the technology of the present and the likely advances in the next ten years mean that such a system is technologically, but not economically, feasible. We believe, moreover, that the system thus defined is not realistic for the IPCUR universitites and those in British Columbia.

There are no cost figures for existing semi-automated bibliographical endeavors which show that the manual work can be done with the aid of a computer at equal or lower cost: and there are no cost estimates for future bibliographical work and for the larger system as defined above which show that the manual work can be accomplished at the same or lower costs. Indeed, the costs of operation of automated information networks are quite high. The Tyas Report is particularly clear on this point. The figures in that report are limited to the provision of scientific and technical information and are cited as follows:

> Estimates prepared by the Economic Subgroup proposed establishment of a swifter STI Network, containing six main regional information centres, introduced

> over a two-to three-year period. Cost for these centres was estimated at $1.5 to $2 million each for initial input and programming; the annual operating costs came to $2.5 million per centre. When all six are fully operating, the Government would have a capital investment of $12 million and running costs of $15 million yearly. This network can be increased to 20 centres over another three to five years, and the Government would be committed to no more than $50 million in operating costs annually and an additional capital investment of $25 million.*

If these figures were to be reduced to show the distribution for the area and population of IPCUR, they would still most likely be in excess of the figures for present services. Furthermore, we believe that the Tyas Report figures are not substitutes for, but should be considered as additions to, the existing costs

Technically successful automated systems cannot be substituted for all of the key elements required for acceptable levels of rationalization of library programs. Automation may assist library managers to know more about their collections faster, hence allow better planning for acquisitions and the processing of library materials with more chance that materials will be placed where they are most needed. Automation may also help the user to know where in the system he will find library materials important to him. But the kinds and amounts of library materials required on local campuses are functions of the academic programs, and patterns of research and study of

---

*Scientific and Technical Information in Canada. Part I. Ottawa, The Queens Printer, 1969. p. 10.

faculty and students. Hence, rationalization of library programs will not be achieved without rationalization of academic programs and changes in patterns of use of library materials, and the major payoff for rationalization is rather clearly in the rationalization of the academic programs themselves.

Furthermore, an important part of a successful rationalization program will be a function of the speed and economy of getting books moved about from campus to campus in response to contemporary demands. The time and cost of moving any significant amount of library material by physical transport or facsimile transmission among the libraries over the vast distances encountered in the Prairie Provinces will be large enough for some time to come to detract significantly from the utility and economy of automated systems that locate materials quickly. IPCUR should expect to have to allocate more funds for the transportation of books and people as the ease of locating books quickly in the system increases.

We believe even more strongly than Guy Sylvestre suggested* in his "Cooperative Acquisition Plan for Canada" that the attempted rationalization of the information resources will fail until the university administrators can rationalize the academic and research programs.

Although automated library systems invariably cost more

*Guy Sylvestre. A Cooperative Acquistion Plan for Canada. Statement made at the meeting of the Commission on Library Coordination, Annual Meeting of the Association of Universitites and Colleges of Canada, Ottawa, November 5, 1969. p. 7. (Processed)

than the manual systems they replace, they have potential for the following economic advantages: (a) the unit costs of output (e.g. a book ordered, an invoice typed), may be lowered, and (b) more and different kinds of lists, dealers' discount and performance reports, outstanding order controls) than output can be obtained (e.g. in-process/is possible with any reasonable amount of staff time to do the same work by hand.) Thus, if libraries are expanding in size and amount of work, they may cost less to operate because of increased productivity at some future date if automated than they might if they continued manual practices. This is the truly relevant economic justification for automation.

No multi-campus automated system for libraries has yet been made fully operational. Work proceeds at a number of projects on various aspects of interlibrary cooperation based on computer facilities (e.g. the Ohio College Library Center, and the New England Library Network). The problems yet to be solved are complex and costly to resolve. They involve general systems considerations as well as matters of strictly local concern. Unfortunately it is not yet possible to predict how much of an investment will be required anywhere to bring generalized library automation systems for multi-campus networks into existence. Because of this unpredictability, and given the existing great shortage of funds for the acquisition of basic library materials that would be required on each campus even with automation, we cannot recommend that these

schools invest in the as yet risky business of attempting to develop a total automated regional library system. IPCUR would be better advised to proceed along less ambitious, but still useful, lines pending developments elsewhere on which its constituents can capitalize.

The matrix of problem areas for various aspects of automation suggested for the Library of Congress as shown in Table I, shows a breadth and pervasiveness of the problem areas involved in automating individual libraries to be assembled into a system. There is no library activity that does not contain problem elements in automation for system design, and many automated routines and services may have as many as a dozen concerns other than the strictly technical matters of systems analysis and programming that must be resolved for successful networking.

The maximum, large-scale system for automated library tasks and services covering all of the IPCUR schools will come not from the study and design of a full-blown system to be introduced throughout the schools all at once, but from the development of multi-campus automated systems involving several campuses at a time, that may ultimately be linked into larger units of operation. In other words, large-scale, widespread systems that encompass all IPCUR schools will best be advanced at present, through growth based on expansion of the most successful small-scale (in size, region and number

of schools covered) systems.

IPCUR should take steps to increase the probability that such linkages will be feasible and attractive. This can be achieved through the establishment of an IPCUR agency for library automation that will: (a) emphasize the creation and use of standards; (b) monitor local automation projects in the developmental stage to promote the acceptance of alternatives in system design that lead readily to linkages among campuses; (c) assist in providing documentation of automated systems; and (d) undertake the development of linking and switching mechanisms and elements of network capability that local campuses cannot do alone. More detailed functions for such an agency are listed in a subsequent section of this report.

The essential ingredients for this purpose are:

1. Standardization:
2. Surveillance of local projects to promote the acceptance of alternatives in system design that lead readily to linkages among campuses:
3. Documentation of systems as they are developed to increase their use:
4. Development of linking and switching mechanisms and elements of network system design.

Success in rationalization will come through economy in library operations. This is a function of the quality of internal management of the libraries individually, and of the understanding of their cooperative programs. It is also a function of the cooperation among faculty groups on various

campuses (to steer clear of unnecessary competition for students and the resources to support them in various subject programs). Better management in libraries comes from well designed systems for processing materials and serving users, from the availability of well selected and well trained staffs, from good technical support for the libraries' staffs (e.g. equipment, space, access to new technologies), and through constant surveillance, testing and refinement of systems and procedures.

The real measure of value of practices that lead to rationalization must, however, always be stated in terms of service to the user. Automation can help, for example, to expose more users to more information, with greater assurance that the users will find pertinent materials. Information can be communicated rapidly (in short messages), but the movement of books and journals moves more slowly. Again, as we noted earlier the automation in the world will be to no avail if library materials cannot be put into the hands of users within time limits they deem acceptable. Service time requirements will vary depending upon the use to which the information gotten from the books will be put. The type of user and other factors which cannot be handled entirely within a "storage" system optimized for known-item retrieval.

II. PROGRAM FOR ACTION

1. Areas of Opportunity for Automation

Projects and programs whose purpose is rationalization in library services can and should take place at three organizational levels. These levels, listed in the order in which activities can be most quickly undertaken with highest probability of success, and selected goals and topical areas for development for projects to achieve rationalization are as follows. These lists are not all-inclusive. Items listed should be assigned priority for study and development. The list is not intended to be prescriptive, but rather defines the area of reasonable investment opportunity for the period of years immediately ahead.

A. Programs and projects for rationalization at the campus level:

1. Systems that provide for repeated use of computer based bibliographical information, with single input and subsequent refinement:
2. Creation of machine-readable records to be analyzed for management purposes:
3. Creation of machine-readable records of holdings with access that provide for analysis of collections to determine their quality for users' needs:
4. Selective dissemination of information based on MARC and other tape services to (a) assist in

making decisions on selections, and (b) to inform users of new literature in subjects of interest:

5. Automated systems that improve the quality and amount of service and provide for faster service:
   a. Circulation control.
   b. Delineation of strategy for locating information among all available resources, tailed to users' demands.
   c. Location of material on campus.
   d. Announcement of new publications in the system (non-selective).
   e. Monitoring of material in process.

B. Programs and projects for rationalization at the regional level (library interaction):

1. Projects that make joint use of MARC records.
2. Cooperation among faculties for planning specialties and courses to be offered;
3. Creation of generalized modules (software) for library processes for local application:
4. Development of systems to perform various tasks in one place for several libraries:
5. Projects that tend to increase the usefulness of electronic data transmission for interlibrary communications for any purpose:
6. Projects that tend to improve the ease and speed of transfer of books and people among libraries:
7. Provision of bibliographical and information services based on machine-readable files

(internally and externally generated) at cost:

8. Expansion of specialized bibliographical and information services in various subjects to cover more than one campus, using machine-readable files (internally and externally generated), at cost to the user or user campus:

9. Projects that add to or draw from national services.

C. Programs and projects for rationalization at the national level:

1. Submission of data and information to national services:

2. Use of national files and services for local needs:

3. Cooperative planning of collection development:

4. Cooperative planning of academic program offerings;

5. Improvement of national interlibrary loan policies to give premium to joint use of materials (but not at the cost of lowering essential and high priority service to users of the lending library).

2. Recommendations: An Interim Program

A. A number of Canadian university libraries, including both IPCUR schools and others, have been able to mobilize sufficient resources to undertake substantial automation projects. Other IPCUR schools should be encouraged to make use of as much of this work as possible. This is not simply a

matter of copying software and installing similar machines on the "underdeveloped" campuses. Because of the many variations in configuration of library facilities, in ways of operating local libraries, in the form, style and content of local records, and other characteristics of individual library environments, software is not readily transferrable. Slight differences among the computers of the same model require modification of programs. The advanced libraries are not yet funded well enough to spend so much time and resources on the problems of other libraries. IPCUR chief campus officers should give priority in funding to proposals from their libraries that aim at the exploitation of already developed systems and software elsewhere, and the "host" library should be further subsidized to provide additional staff, travel, and publication costs related to their effort on behalf of other libraries.* Funds for data conversion, particularly should be sufficient to avoid mutilated record conversion projects.

B. Priority for automation t[illegible]ks should be given to those elements of operation that create bibliographical records of holdings. This begins to provide the data base that will be most useful in locating materials in the network of libraries in IPCUR schools, in analyzing the collections of individual

---

*The inventory of automation work in Canadian libraries appended to the AUCC report: Standardization in Canadian University Libraries--an Approach and a Proposal will be useful in identifying the potential of various schools to serve as the developmental agency for various automated library tasks.

libraries and groups of libraries for the purpose of identifying strengths and weaknesses. Attention should be given to automation in the acquisitions area first in order to capture information about books coming into the system at the earliest possible moment. Action should be taken as soon as possible to begin to merge data bases from several campuses.

The creation of a combined record of holdings in machine-readable form of the libraries that feel they can usefully cooperate to provide joint access to literature is an essential development for success in rationalization programs. The task of creation of the combined data base should be divided into two parts: (a) input of current acquisitions, and (b) conversion of retrospective records.

Efforts should be devoted first to the capture of information concerning current input from acquisitions and cataloging for a combined machine-readable data base. Once this task is under control, the size of the retrospective file will be constant, and plans can be made, with accurate cost estimates, to convert it.

The current record can be captured and merged in several ways.

(1) Centralized processing. If a central technical processing department were to be established to do the acquisitions and cataloging, or at least some aspects of these functions--for the IPCUR libraries, the center could obtain data for a union catalog of current holdings automatically as a by-product of the ordering and cataloging work for the

individual libraries. The center could create book catalogs for individual campuses, or for any combination of campuses, and according to several arrangements (e.g. by author, title, subject). Centralized technical processing for all IPCUR schools is not recommended at this time.

(2) Pooling of locally produced records. The most frequently used technique to produce a union catalog of the holdings of several libraries has been to collect catalog copy after it has been produced by the individual libraries in various localities, to be interfiled in a separate bibliographical center. The record is thus not a by-product automatically obtained, but an add-on product, actively made viable only through conscious effort by individual libraries to contribute their catalog copy to a bibliographical center after they have themselves produced it.

In the automated mode, the separate, pooled record could be created by having individual libraries send machine-readable cataloging copy (e.g. magnetic or punched paper tape or punched cards) to a central source for merging, storing and service. If this were done, a standard format for the communication of bibliographical information in machine-readable format must be adopted. We recommend that the MARC format be adopted for this and other interlibrary communication purposes.

At the present time it appears that the centralization effort, if it were deemed appropriate, would produce meaningful results in terms of introducing useful services sooner

and cheaper if a center were established to collect records of library materials as they are ordered or received (in the case of gift items)in local libraries. Such records would have to be up-dated as the books are processed and added to collections on local campuses. The center would then have a data base that could be queried by any local campus to ascertain if particular titles were on order or available elsewhere, for whatever use that information might be, and that could be transmitted to the National Library of Canada to support the development of the proposed large-scale, automated national union catalog effort. The IPCUR universities should avoid the establishment of a system for a regional purpose that cannot be altered from time to time to be compatible with a national system for Canada.

(3) Conversion of retrospective records. Part of the input may already be available in machine readable form by the time IPCUR organizes to convert retrospective catalog records. The Library of Congress of the United States is working on the problems of converting its various catalog files to machine readable format (RECONS Project). If this project is successful, a large machine-readable data base will be available for local use. Libraries wishing to use RECONS products will have the problems of matching records on the RECONS tapes with local holdings, and of ascertaining how much and how accurate the information on the tapes is. Undoubtedly IPCUR libraries will contain a significant amount of material that will not be covered by RECONS services, hence

IPCUR will still have a large conversion job to fund. Retrospective conversion should not be begun until a system for handling current input is operable.

C. We recommend that IPCUR establish a Library System Development and Service Office, administratively responsible to IPCUR, and preferably not located on the campus of any IPCUR school. The Office would perform the following functions essential to the promotion of rationalization through automation:

1. Develop a master guide for the assessment of local automation proposals in terms of the potential contribution of developments to serve the purpose of rationalization.
2. Guide the integration of local effort in automation into an interactive network.
3. Review all plans for library automation of IPCUR member libraries and provide a critique of these plans for chief campus officers.
4. Plan and arrange for the development of automation projects on its own initiative that promote inter-campus use of library materials and the new means of access to information.
5. Develop general automated systems software packages for library tasks.
6. Assist local automation staffs in the application of these packages on each campus to suit their local needs and idiosyncracies.

7. Serve as the negotiator for the development of standards in automation and system characteristics and operations.
8. Act on behalf of IPCUR libraries in assisting the National Library of Canada in its development of an automated national bibliographical service.
9. Assist in the training of local campus library staffs in the basics of library automation, and, for those who need it, the advanced technologies in the use of computers in libraries.
10. Offer consulting services on local campuses on all matters of library automation.
11. Carry on special studies that enhance the development of automation applications that serve the purpose of rationalization.
12. Generate grant proposals for developmental work in library automation.
13. Review and inform IPCUR representatives and local campus librarians of the state of the art in library automation and information science.
14. Assess budgetary needs for the development of automation needs at local and regional levels, and to advise IPCUR representatives of the need for funds.
15. Facilitate communication of local applications development among the IPCUR librarians.

16. Accumulate machine-readable data on the holdings of individual IPCUR campus libraries.

17. Operate regional union bibliographical services based on the holdings of IPCUR libraries, these to be developed from the process of accumulation of machine-readable bibliographical data from local libraries as they produce it. (At the same time, the office should be helping the National Library establish a national machine-readable bibliographical file of holdings of Canadian Libraries. When such a file is operational, the office would transmit local tapes to that file, or would direct the local libraries to send them to the national file. The office would then shift its attention to using the national file in order to provide management advice and guidance on collection development needs in the IPCUR region).

18. Work with other regional bibliographical centers in Canada and elsewhere to coordinate developments in the IPCUR region with the work of these centers in ways that insure the viability of operations that increase the potential for rationalization.

19. Assist in the documentation of on-going automated tasks in various libraries, thus facilitating the transferability of automation among libraries.

20. Assess hardware as it is developed and to represent IPCUR libraries among manufacturers.

D. IPCUR schools should cooperate closely in the exploitation of specialized, computer-based bibliographical and information services being developed or available from sources outside the university.

The computer will do more than serve as a tool for library automation of technical services, and for the analysis of the data bases thus created for service to faculty and students. An ever-increasing number of data bases in machine readable form containing data and information useful for reference and research purposes are being created by government, commercial and other agencies. Libraries of the future will have to have a computer or information processing capability in order to provide access to these files just as they now provide access to information in printed indexes, catalogs, encyclopedias, etc.

Typical examples are:

Chemical Abstracts on tapes
Science Citation Index in tapes
American census data (to come after 1970 census)
NASA bibliographical tapes
MEDLARS tapes (U.S. National Library of Medicine)
MARC tapes (Library of Congress cataloging information)
Scientific and Technical Serials in Canada
(National Science Library)

The National Science Library of Canada offers a service of searching several of these files to locate bibliographical citations that match interest profiles of its customers. This selective dissemination of information system need not be duplicated on various campuses: they can be accessed for a fee through the National Science Library. The University

of Saskatchewan at Saskatoon is testing the value and quality of this service with a number of its faculty. The Alberta Information Retrieval Association, with the cooperation of the Universities of Alberta and the Research Council of Alberta, was formed recently to provide computer-based current-awareness services to Canadian scientists. AIRA works with the Chemical Titles tapes and the COMPENDEX tapes in engineering. It helps a limited number of users gain access to several tape files at the National Science Library. The Department of Computing Science at Alberta and the Information Systems Group at the University of Calgary are key agencies in the offering of these services.

Such cooperative ventures should be continued and expanded, hopefully with as little duplication of effort as can be managed. The cost of acquiring and searching these services is high: these resources and the systems and programs for using the tapes should be shared to the fullest extent possible. It would be advisable to develop a search capability in or near the libraries that can most probably offer the highest quantity of literature on which each tape is based, although this is not an absolute requirement. All search services should be offered on a cost basis, with each campus, or each user, paying a share of the costs of acquiring and searching the tapes according to use.

In optimizing both technical progress and economic dividends from such projects, the role of the proposed IPCUR Library System Development and Service Office would be an essential element.

APPENDICES

APPENDIX A

Campus Visit Assignments

Russell Shank

University of Saskatchewan, Saskatoon
University of Saskatchewan, Regina

Duncan Hall

University of Manitoba
~~University of Winnipeg~~

C. Dake Gull

University of Alberta
University of Lethbridge
University of Calgary
University of Notre Dame (not visited because of air reservation errors)

Edward Heiliger

Simon Fraser University
University of British Columbia
Victoria University

APPENDIX B

Comment on the Gross Proposal (1968)

Several shortcomings of technology for automation in libraries are noted in the proposal to IPCUR for a study of library automation made in September 1968 (Gross). One of the objectives of the proposed study states that centralized circulation system would have to be accessed by some form of terminal probably not yet in existence. Another task for the proposed study would be "to investigate the economics of memory files and data communication requirements for a ... data bank where holdings are stores in machine readable form." This is followed by a recognition that this system is 'probably some 5 - 10 years off being a practical reality."

The concern about circulation systems on an inter-provincial level is misplaced: circulation control is the least of the task areas that are likely to contribute meaningfully and economically to rationalization if automated. And if a useful machine-readable data base will not be practical for the next 5 to 10 years (a vague generalization that really means it is impossible to predict when such a data base will be available), consideration of the economics of a memory file and data communication is premature and a waste of time at this time.

The proposal improperly defines the MARC concept (Library of Congress Machine Readable Cataloging format for

the communication of bibliographical information in machine readable form). It is not a system to be tied into, as the proposal suggests might be possible hence worth study. It is a service of the Library of Congress that distributes cataloging copy for some of the books cataloged by the Library of Congress in machine readable format. As such it provides the data base for automating some aspects of part of the acquisitions and cataloging functions. The problem to be faced by local libraries is not how to tie into the MARC system, but ~~how to design a system to~~ use the MARC service records.

The proposal calls for a feasibility study of an odd and incomplete assortment of library functions and pieces of records, when it should be addressed to an examination of the problem areas of IPCUR libraries most amenable to automation, to priority order in which these problem areas should be studied in detail (with regard being given to the state of the art of automation and communication and to library and campus needs), and a generalized system design statement which then could be the subject of a feasibility study. In other words, the proposal says: "Have machine--what's your problem?" rather than "What's your problem, then let's see what characteristics of these problems suggest the utility of machine applications."

APPENDIX C

Miscellaneous Correspondence In Connection with the Project.

The following selection of correspondence on the project is included because of its general relevance in defining the intent and limits of the study. No attempt has been made to include all of the correspondence of the study team, or informal memoranda between members of the team in which detailed problems within the overall library automation picture were summarized.

THE EARLY INFORMAL REPORT OF DEC. 18, 1969

The study phase of the project was originally expected to be carried out in August and September of 1969 but was delayed for some time awaiting authorization and funding by IPCUR. In spite of the difficulties in personal committment schedules caused by the delay, members of the team had completed all of the campus visits by the end of November, and had held several general meetings in Washington and Kent. By the middle of December, the shape that the major findings would assume had become clear, and was put in the form of a 12 page informal letter memorandum to Dr. Riddell. The informal report was drafted for the study team largely by Dake Gull. Its essential content is of some interest, and can be summarized in the following excerpted text:

> "This team believes that the technology of the present and the likely advances in the next ten years mean that the system...is technologically feasible."
>
> "The team, however, does not believe that the system is realistic for the IPCUR universities and those of British Columbia for the following reasons:"
>
> The three major findings made were that
>
> 1. Development and operating costs for the computer-based subsystem would be excessive, as suggested by both actual experience of similar projects and independent estimates such as those of the Tyas commission. "These costs out should be considered as a additions to the exiting costs."
>
> "2. The rationalization of the library and other information collections...is a function of the rationalization of the academic and research programs of the participating universities. ....We believe

that the human beings making up the universities will resist every attempt to rationalize the academic and research programs by controlling the growth of the information resources through rationalization. We believe...that the rationalization of the information resources fail until and unless the university administrators can rationalize the academic and research programs."

"3. The IPCUR and British Columbia Universities ought to avoid the establishment of a system for a regional purpose if that system has any possibility of being incompatible with a national system for Canada." The requirement for handling inquiries to an uncontrolled data base not now in digital form (and both very large and complex) is a particular design factor which should not be compared naively with familiar but altogether different examples such as the airlines reservation systems. "The project team found no evidence..." that the librarians or computer people "had determined what the actual needs for service are which will be required in the design of an information system network."

The major conclusions of the early memorandum set forth essentially the same package of recommended actions incorporated in the major project report and elsewhere.

UNIVERSITY OF SASKATCHEWAN REGINA CAMPUS

PRINCIPAL'S OFFICE REGINA, CANADA

June 13, 1969

Mr. H. Duncan Wall,
Assistant Librarian for Planning
and Development,
Kent State University,
Kent, Ohio 44240

Dear Mr. Wall:

The universities of Western Canada, through the Interprovincial Committee on University Rationalization, have embarked on a joint examination of the possibilities for automated procedures in the various libraries that would permit the eventual linking of these libraries for more effective utilization of the resources.

Since there have been quite a number of studies undertaken with the objective of developing a system or systems that could be adapted to a group of libraries, we decided that we would engage a consultant who was familiar with this area. Knowing of your recent study for the Ontario Council of University Librarians, it was agreed that we would ask if you would be available to undertake this study.

As a preliminary guide to assist you in assessing the request I provide the following information:

1. There are eight libraries in the three prairie provinces involved in IPCUR that are directly involved but, in addition, it has been agreed that the three university libraries in British Columbia should be included because of their interest, and because the University of British Columbia and Simon Fraser have probably the most advanced automated systems in Western Canada.

2. Apart from the B.C. systems, there have not been any extensive applications of computer procedures, although all but one or two are planning to initiate programs.

3. The librarians estimated that with your knowledge of the field and of the Canadian situation it might be possible to complete the work in about two months.

4. The general objectives of the study have been stated as follows:

The project will fall within the broad aim of IPCUR's interest in libraries, i.e. the rationalization of library development.

The general objectives of the project are to investigate co-operative automated systems:

1. as one means of guiding collection development,

2. as increasing the sharing of library resources,

3. as providing better library services at the same or lower cost than could be otherwise achieved,

4. in relation to national computerized catalogues and other computerized services being planned by the national libraries.

5. in relation to other co-operative systems and projects being planned on a regional, national or international basis.

If you are interested in enquiring further I would be pleased to have you write me and, if you wished, could arrange to meet you when I am in eastern Canada toward the end of the month. I would also appreciate some indication of the time when this could be undertaken and the financial arrangements you would expect. I would need to have this in order to secure some final approval of the project.

Yours sincerely,

W. A. Riddell,
Principal

WAR/dt

KENT STATE
UNIVERSITY
KENT, OHIO 44240

SCHOOL OF
LIBRARY SCIENCE
(216) 672-2782

Kent Center for Library Studies

July 3, 1969

Dr. W. A. Riddell, Principal
University of Saskatchewan
Regina Campus
Regina, Saskatchewan
Canada

Dear Dr. Riddell:

Thank you for your explicit letter of 13 June, which I believe gives me a sufficiently clear view of the task at hand. Unfortunately I have had to be a little slow in making a response to your letter, partly because of a protracted heavy cold, and partly because I wanted to talk with several other people about it. I am happy to put on paper below the information which I gave you by telephone yesterday.

I believe strongly that it would be preferable to handle a planning task of the kind you describe as a team project probably using a blue-ribbon team. A convenient instrument for this purpose is the Center for Library Studies, a research arm of the Graduate School of Library Science at K.S.U. Among other activities, the Center assists in formulating survey and consulting projects, in locating particularly qualified consultants, and in assembling study teams.

I have discussed the matter at some length with the Director of the Center, whose signature also appears at the foot of this letter, and we would like to make the following counterproposal:

We would like to assemble a blue-ribbon team of three to four particularly experienced people: a list of prospective members is appended. Individuals from the team would spend several man-days on each campus as appeared necessary, and visits to Toronto and Ottawa would also be made. Total man-days would not exceed 50, or approximately would be about 90 days: the field work in Canada would be done in August and/or September, and a summary report of perhaps 50 pages would be prepared by the team in Washington or Ohio and presented to IPCUR in November. Two or three of the team would return to Canada for a discussion of the report after the report had been submitted.

I estimate the cost of using a team in this manner would not exceed $11,500, but the Center will require a fee of 10% for assembling the team and handling certain details of its work, and the total cost might therefore approximate $12,600. The cost of the four man team is somewhat higher than the cost of an equivalent effort from a single person, if a qualified one could be found, but we believe the balanced perspective and greater authority of the team is preferable to the present task.

Sincerely,

H. Duncan Hall
Associate Librarian for
Planning and Development
K.S.U. Library

Edward H. Heiliger, Director
Kent Center for Library Studies
Professor, School of Library Science

lhd/iz

cc: Cloyd Dake Gull
Russell Shank

PERSONNEL PROPOSED FOR THE PROJECT TEAM

As we presently conceive it, the project team would have four members. Brief resumes follow below for the four people proposed. The project has been discussed briefly with each, and each has indicated particular interest in participating, and probable availability, particularly if details of the project can be firmed up soon. At the moment no guarantee can be made of the participation of any of the four.

Dr. Russell Shank. Dr. Shank, 43, is presently Director of Libraries for the Smithsonian Institution, and would probably be chosen by the group as its project leader. The Smithsonian Institution, perhaps best known for its scientific work in progress. Dr. Shank is the holder of four earned degrees, including a B.S. in electrical engineering, M.B.A. in business Administration, and Ph.D. in library service, the latter from Columbia University. He has extensive academic library experience, and served for five years as Assistant Librarian of the University of California at Berkeley. He has taught in a number of library schools, and has recently produced a program plan for the integration of the science library resources of the New York Metropolitan area. The study was done for METRO, the responsible regional library agency for the Metropolitan area. Shank is originally from the American northwest, and his parents homesteaded on the Canadian prairies.

C. Dake Cull. Mr. Cull is 54, the holder of three earned degrees including the sixth-year Master's degree in Library Science from the University of Michigan. He has extensive experience in research libraries, has worked for the Library of Congress at the Deputy Division Chief level and as a principal member of the Information Systems staff of the General Electric Company was involved in the creation of the automated MEDLARS system of the National Library of Medicine. He has extensive teaching experience at the University of Indiana graduate library school and four others, including McGill. He has been president of the American Society for Information Science (the principal professional society in its field) and chairman of the U.S. National Commission for the International Federation for Documentation. Until recently he has served as Liaison Officer for the National libraries in the U.S. He has just finished an automation program plan for one of the massive bibliographic operations of the Library of Congress. He is currently active as a private consultant in a firm in which John Cornin, recently Director of the Processing Department of the Library of Congress, is also active.

Edward M. Heiliger. Professor Heiliger, 59, is Director of the Center for Library Studies and teaches data processing courses in the School of Library Science of Kent State University. He holds three earned degrees, including an M.A. in history from the University of Denver. He has extensive university library experience in Latin America, and in the

U.S. has served as Associate Director of the New York State Library, Director of Libraries for the University of Illinois at Chicago, and Director of Libraries and Information Retrieval Services of Florida Altantic University. At Illinois and Florida Atlantic he was responsible for important pioneering efforts in the use of computer-based system in academic libraries which have greatly affected subsequent developments through the training of personnel (many of them now quite prominent in the library automation 'movement,') and through the articulation of many of the intellectual-linguistic distinctions now embodied in digital catalog formats such as the MARC format. His book on library automation, co-authored with Paul Henderson of the Allis-Chalmers Corporation, is now under consideration by a major publisher.

H. Duncan Wall. Mr. Wall, 35, is Assistant Director of Libraries at Kent State University. He holds an M.S. from the School of Library Service of Columbia University. He participated in the design of the original MARC Pilot Project of the Library of Congress, and worked for two years with the United Aircraft Corporate Systems Center on the first three phases of the System Development Program of the Library of Congress. In 1968, as Systems Consultant to the Ontario Council of University Librarians, he conducted a detailed survey of the prospects for innovation and integration among the university libraries of Ontario. He developed an action plan for the Committee of Presidents of Universities of Ontario notable for a carefully staged five-year program

to provide powerful tools for assisting individual university libraries in their responsibilities, and notable also for its de-emphasis of immediate organizational changes.

WORK STATEMENT FOR IPCUR PROJECT

A summary of the tasks to be carried out by the survey team.

1. Examine the development of the universities and their libraries in the light of changing requirements for information and library resources, and in the light of changing technology.
2. Identify opportunities for organizational and technological innovation which are available within actual technical, economic and political constraints, both long-term and short-term.
3. Forecast costs and benefits likely to result from various types of technological and organizational innovations, in the generalized terms required for an investmental decision by the universities:
4. Identify organizational and fiscal measures required to realize these opportunities;
5. Synthesize the program most satisfactory in terms of benefits, costs and hazards, priorties, etc.
6. Summarize the key points in the program and its supporting argument in a brief report sufficiently readable by persons who are not library or computer specialists:

ON SOME SPECIAL PROBLEMS OF NONCATALOG DATA BASES

Edward M. Heiliger

Cooperation in Western Canada on the acquisition and use of data bases can be a major reason for creation of an IPCUR center. The major problems in data base use are the following: 1) Selection: 2) Overlap: 3) Training: 4) Cooperation: 5) High prices; 6) Royalties: 7) User Profile construction: 8) Question profile construction: 9) Retrospective searches: and 10) Lack of standardization.

Selection guides for machine readable materials are not available. Therefore, there must be cooperative effort to critically judge existing and new data bases. Standards for evaluating must also be developed. The Canada Consortium should be able to do this collectively for its own needs.

Commercial data base services have a strong tendency to overlap with each others' services. This is done knowingly, on the theory that a wider coverage will make the product more marketable. A Canadian center could develop a standard file format adequate for searching all commercial data base services. Coversion to this format could be done once for all Canadian users as each service output arrived. The searching time thus saved, would greatly reduce the cost. The University of Georgia and the Illinois Institute of Technology Research Institute have both developed such a format and are giving service to business and industry, as well as campus users. They estimate a 70% to 80% saving by dealing with overlap in this fashion.

A cooperative effort is needed in the considerable problem of educating library staffs, computer staffs, and users in an awareness of what data bases there are and what proper search techniques in their use will yield. Also, people must be trained in the use of these bases.

The very high price of many of the commercially available data bases is perhaps the strongest argument for cooperative effort. The Goodyear Research Library in Akron, informs me that Engineering Index tapes are quoted at $6,000 per year, the complete PLASDOC tape service (patents) from London is $4,000 per year, and the one service (polymer science) they get from chemical abstracts is $1,000. These are only a few of hundred that are being offered. Joint use of such services would make subscription possible and add considerably to the resources of the cooperating universities.

The development of a system-wide Selective Dissemination of Information program for relating the data base services to the individuals on each campus needing specific information from those services will call for an effort which could best be done cooperatively. User profile must relate to the structure set up for data base use. Question profiles for individual searches must also be constructed according to accepted techniques.

All of this could best be handled by a well staffed center devoted to cooperative use of data bases.

Although most data base services are concerned with current awareness, those who buy the tapes are gradually building capability for retrospective searches. This capability will become increasingly important. A Center can be a resource for such searches.

There are two extensive lists of data bases. One is a ~~commercial loose-leaf service provided by~~ Science Associates International, which contains detailed descriptions of over 318 major data bases in the field of science. The Kent Center for Library Studies has compiled a less detailed list of 368 data bases and a source of data bases for the social sciences and humanities. EDUCOM is undertaking a file resources survey of its 100 universities. The results of this should highlight the vast number of locally produced data bases that universities generate. Many Canadian universities are members of EDUCOM.

Existing telelphone networks have been set up for voice communications. Recently there has been an increased need for graphics transmission, closed circuit TV transmission, computer-to-computer communication, etc., much of which requires wide-band capability. The solution to this leads to consideration of private microwire networks and communications satelites, both of which can provide this. At the EDUCOM Fall Council meeting in October, a communications lawyer from New York predicted a great growth in microwave networks in the next few years. At the same meeting, a U.S. senator from Alaska, talked of the potential of a communications satellite to tie Alaska more closely to Washington for various purposes, mainly education. He also mentioned exploratory talks between Canada and the U.S. on negotiations for putting up a communications satellite for Canada. A tentative cost figure given was in the neighborhood of $25,000,000. At this Spring's EDUCOM Council meeting, President Nixon's special assistant on communications said that the wide-band capability of a domestic communication satellite launched. There is some evidence in the U.S., that the telephone networks are moving to meet the competition. A three year experiment by AT&T is beginning in the tier of states running from Illinois to New York, called system 11,000. This provides a broad-band communication package between two heavily used points plus regular service to other parts of the area for a special price.

Two developments in British Columbia universities (U.B.C., Simon Fraser, and Victoria) merit attention. Each university library has a strong systems staff and a strong collection-building staff. Members of these staffs get together with their counterparts at the other universities for exchange of information. This approach to both library automation and improving the total offering of the three universities seems to have merit. The prairie provinces might give this a try, both as an aid in the individual efforts of members of IPCUR and as an aid to any cooperative center established. A field as new as library automation requires experimentation and innovative efforts. Those involved in this on each campus can benefit greatly from sharing experience and know-how with those with the same specialty on other campuses. Cost and use studies are badly needed and they could be undertaken cooperatively. Automation can help collection building, by providing information about the collection and its use, and in other ways. A computer-assisted cooperative effort at collection building, with staff specialists at each university, should be able to create a better total resource for the same money. The distances involved impose some restrictions, but then there are areas, such as long sets of little used journals, and rare book materials in special fields, that could be shared and not duplicated.

Equipment costs per operation are going down exponentially. Software costs are going up just as precipitously. This suggests sharing of programming work in such a way that software costs can be kept in line. EDUCOM has set up its EIN network to help accomplish this for its members. Available programs are listed regularly for distribution to members. For some purposes the emphasis will be on service sharing rather than program sharing, but the essential problem is cutting the software cost. An IPCUR center could aid in this direction in the same way.

THE ROLE OF THE BRITISH COLUMBIA UNIVERSITY LIBRARIES IN THE COOPERATIVE PLANNING OF THE PRAIRIE PROVINCE LIBRARIES

Edward M. Heiliger

The University of British Columbia, Simon Fraser University and the University of Victoria would be a formidable group in anybody's library automation competition. Fortunately, the individuals involved in this extraordinary effort are cooperating with one another and are willing to extend this cooperation to other parts of Canada. They are busy people, with their full share of the problems that university libraries have these days. Serious approaches by prairie provinces people are respected. There is a certain desire for feedback that hasn't been fulfilled. Has the help given resulted in any positive development to those helped? Have they, in turn, discovered new methods as a result of the help given? More give and take between the two groups would hopefully lead to a more fruitful relationship.

A query by one B.C. librarian indicated a strong interest in just what was going on in library automation in Ontario. There was a certain respect in his voice that indicated a feeling that a fruitful cooperative effort with Ontario might be useful. If the prairie provinces work at library automation, they can shortly offer the same attraction and meet the B.C. libraries on a more equal ground.

The three B.C. libraries all have systems staffs, with systems people, programmers and computer-oriented librarians. These staffs meet together and exchange information. The directors of the libraries do likewise, and so do the members of the collection-building staffs. The latter is important because one of the savings resulting from better library automation and communication will be in the collection building area. The effect of this kind of cooperation might also assist in cooperative curriculum-building planning. The absurdity of having a medical school on every campus can be more clearly seen if the cost of developing and maintaining a medical library are considered. The availability of fringe materials for medical research then becomes a matter of cooperative effort.

The Canadian Rockies are simply not the barrier they once were. The isolation mentality of B.C. is melting, with somewhat more orientation to the East, but it is still there. The enormous size of the Canadian provinces tends to create a texas mentality that makes for happiness in your own area without much concern for the outside world. Fortunately, every effort apparently is being made to break this down. Success in this over-all effort will help the librarian.

Cooperative development of data bases usable by the B.C. University libraries and by the university libraries of the prairie provinces could be fruitful. Also, cooperative use

of expensive commercial data bases has real possibilities. Both of these would call for decisions on standards, storage, and communicative. The current EDUCOM effort to inventory data bases on the campuses of the 100 universities now belonging to EDUCOM, will give those Canadian universities belonging to EDUCOM a chance to have access to a large number of university data bases. In addition to this file resources survey, EDUCOM is working on the problem of interchange of computer programs (EIN). The documentation Standards Handbook for EIN Software Catalog, published in June, 1969, is part of this effort, All Canadian Universities could benefit from this effort.

APPENDIX D

COMPARATIVE COSTS OF LIBRARY NETWORK PROJECTS

Computer-based library data systems: Costs of some representative projects

September, 1970

Report to the Inter-Provincial Committee on University Rationalization

Prepared for IPCUR by a select study team

Kent Center for Library Studies
Kent, Ohio 44242

We have appended following some figures for the cost estimates (or apparent cost experience) of some projects comparable in scope and overall requirements to the sytem model under consideration, together with a brief review of the context in which the project is progressing, and some key details of its conceptual design.

The cost data has been developed chiefly by Duncan Wall, in most cases from obscure or confidential sources. The actual costs, like the true progress and the economic success of projects of this kind, are usually the object of evasion and actual concealment: they are rarely 'published' in any of the usual senses of the term, and in a number of the cases cited have been procured privately with assurances of nondisclosure. It is invariably true that published 'costs' of projects of this kind are stated inaccurately and in such cases a true picture of projects costs can be obtained only from knowledgeable manipulation of fragmentary cost details obtained privately. There have been a number of cases where commercial systems houses have ended up as much as several hundred thousand dollars in the red on such projects--losses which are not advertised.

No cost estimates concerning data conversion are included in the project cost descriptions. In a few cases, substantial conversion costs are carried as a part of an operational subsystem or earlier system. Cost of data conversion has, with

software and machine costs, been the object of evasion and concealment. No cost estimate of less than 75¢ per record for a record of catalog quality, need command much credibility although studies and conversion projects have often reported lower figures achievable. Actual costs for carefully engineered projects commonly run over $1.00 per title for a record whose quality is capable of maintaining an inquiry system with capabilities comparable to a card catalog. Costs of $1.50-$2.50 per record have been experienced in several places. There have been several notable cases of what appears to be simple fabrication by a large equipment manufacturer whose interests which should be apparent to all but the naive (or those who also are blinded by special interest.) Conversion costs for partial records, reported from a few well-managed projects as low as 12¢ a record on large-volume conversions, are achievable, but are incapable of producing a file whose retrieval performance will be satisfactory in any thing beyond very limited applications.

Nonlibrarians will want to note carefully in this connection that, contrary to expectations, it has not proven possible for one institution simply and easily to make use of the fruits of the conversion project of another library. In a collection of any size, mutual duplication rates fall rapidly, supposed 'duplicates' turn out to possess astonishing differences, and the cost of locating and verifying the 'duplication' begins to approach the cost of actual original conversion.

It is likely that the only real solution to the problem will

be found in the conversion (at high quality standards) of the catalog files of a number of very large libraries, especially the Library of Congress. Conversion by the use of the inquiry method, with the creation of data for local call numbers and locations, variant edition data, etc., via on-line text manipulation, promises eventually to lower conversion costs to a level of perhaps 20 cents per title in quantity. The achievement of such costs assumes the creation and availability of a rather expensive and sophisticated system fueled in advance by a large number of records--say 2 or 3 million--from a really large record conversion of high quality. A number of large libraries for varying reasons have converted 500,000 to 900,000 records, but always at rather mutilated quality levels, e.g., without the added entry and subject data required to reconstitute a full set of catalog cards, or without enough bibliographic data to allow the record to be identified with sufficient confidence with a 'similar' record in the files of another library, or without even enough information for a user to identify most known references with confidence.

The Library of Congress is in fact now pursuing through the RECON project a study of the value to other libraries of the conversion to machine-readable form of its own retrospective files. Its degree of enthusiasm concerning the subject may be judged from the facts that the Library (with a budget requested for 1971 of $51 million) refused to fund the project itself, insisting upon foundation funding; and that the Library, four

years after innovating the MARC 'system' with considerable publicity, still does not use the MARC record itself in any significant internal operation.

The projects whose costs have been cited in the pages following are limited to those reasonably comparable to the model system under consideration. These possess all or most of the following critical characteristics:

1) One or more CPU's dedicated entirely or almost entirely to the system, with a minimum of 256,000 characters of core memory;
2) Many remote users;
3) Operations dominated by the conversational or "inquiry" mode rather than batch mode;
4) A requirement for the creation and maintenance in direct-access memory equipment of data files of a relatively large size by data-processing standards; e.g., the smallest such file included involves 100 million characters at the outset;
5) Operation of the system requires access via bibliographical keys such as author and title to a large number of discrete, lightly used records;
6) A high degree of interaction with the machine system is required by library staff involved in book processing operations, performing tasks beyond the capability of the machine system;
7) Every project requires at least two years from funding

to the target dates for the operation of the first subsystems.

A few cases are noted where some of these characteristics are absent.

A few notes have also been attached concerning the circumstances surrounding the projects, one of which has been officially abandoned (but will inevitably be revived); another of these has been abandoned in fact but without official acknowledgement, and with continuance of development on simpler lines. The projects are all in much more promising circumstances than apply with the IPCUR group, both fiscally and politically.

A number of somewhat comparable projects such as the moribund NELINET (New England) project, have been excluded, although this latter is an excellent example of the great difficulties of conducting a highly innovative, expensive and certainly speculative system development project without a natural political watershed and across the lines of six major political entities. NELINET made a brave and promising start, but never progressed far enough (except in the imagination of the commercial software firm involved) to allow a useful comparison to be made here.

Readers of this report will want to note carefully that actual cost experiences commonly exceed cost estimates, however carefully drawn; and every project cited has been assisted by analysis and planning work or actual development work in a commercial systems house. The projects cited have had major assistance in analysis and design phases, or in actual implementation work, from at

least seven different major system firms and from a number of different individual consultant and ad-hoc survey teams.

A table synthesizing an estimate of the two key components of software development and recurring machine costs follows. If the simple average of project costs is ignored in preference for a more reasonable average ignoring Projects A and G, the most atypical, a reasonable interpretation would see such a project typically costing about $800,000 for each of three years. These costs would exclude certain other significant costs, e.g., telecommunications charges, overhead, etc. When these are included a prudent cost estimate might be a total somewhat exceeding $900,000 in the first year, rising to just over a million in the third. These estimates would not include the costs of large-scale retrospective data conversions by the user libraries.

TABLE I: TYPICAL COSTS, KEY COST COMPONENTS

	Non-Recurring Software Development	Continuing Equipment	Date of est. or Contract
A	160,000	360,000	1967
B	2,000,000	700,000	1967
C	1,000,000	480,000	1969
D	300,000	400,000	1970
E	5,200,000		
F	400,000	500,000	1969
G	1,500,000	500,000	1969
Simple Average:	1,510,000	528,000	
Average of Projects: B,C,D, F,G, discarding highest and lowest projects (A and G)	1,052,000		

Project A. A large computer-based processing center serving several dozen academic libraries.

These are 1967 cost estimates by a well-known firm of management consultants, with no special interests in the library industry affecting the firm's judgement, and a modest amount of previous experience in the library automation field. The conceptual design demanded heavy use of remote batch processing, thus minimizing individual inquiry telecommunications costs and processor costs associated with conversational timesharing in the inquiry mode. A relatively modest on-line file of 200,000,000 characters (an estimated 400,000 titles) was envisioned at the end of the first several years of the project, with local staff at the universities continuing to handle very substantial activities for all library materials, and all processing activites for the more difficult research materials, e.g., serials, foreign imprints, retrospective materials, government publications, and the like.

Estimated Computer costs: $360,000 per annum for a 256Kb processor and an array of other peripheral and memory equipment.

Estimated Software costs: $160,000 for programming and related software, a non-recurring expense.

Estimated calendar time: remote catalog access would be achieved only during Phase III; Phases I and II were estimated to require two years funding.

Project B: <u>A large research library with national responsibilities in a group of disciplines.</u>

The conceptual design for the project began from the base of a previous successful automation project which had been limited to very much narrower goals. The extended system to be produced by the new project replaces manual file-search and processing methods with on-line text editing, computer-based author searching, remote catalog access from distant locations, and a potentially large catalog file. Development of the extended system was preplanned carefully by a well-known firm of computer consultants. Another large software firm has been conducting the development work under contract, with three years initially planned for implementation. The project is approximately a year behind schedule and the contractor is in deep trouble technically.

Estimated Computer costs: $700,000 per annum for a 512Kb processor with an additional million characters of main memory and an array of other peripheral and memory equipment.

Estimated Software costs: $2,000,000 for

programming and related software, a non-recurring expense.

Project C: A large computer-based library data system serving several dozen academic libraries.

These are 1969 cost estimates by an experienced individual without special interests, who carried out a rare survey-in-depth of the actual existing activities of the libraries involved. The conceptual design was for a first-phase 'foundation' system' which provided individual libraries with powerful computer capabilities, without shifting processing personnel to a new center, and without attempting on-line author-title searching capabilities. The program allowed each of these to occur efficiently in a subsequent Phase II when several years later the simpler foundation system had been successfully demonstrated. The estimates are decision-oriented overestimates intended to put an upper limit upon actual cost experience, which would be most likely to be in the range of 60-80 per cent of the estimates.

Estimated Computer costs: costs rising to $480,000 per annum for a 256Kb processor with 800,000,000 characters of direct-access memory near the start of the project (and about 2 billion toward the end of the project) and an array of other

peripheral equipment.

Estimated Software costs: $1,000,000 in non-recurring programming and other software costs.

Estimated calendar time: 2.5 years from funding to first operational subsystems, 4.5 years to initiation of development of more advanced Phase II system.

Project D: A large computer-based processing center serving several dozen academic libraries.

These are 1970 cost estimates by a project now moving through implementation of its first phase, with implementation of the second and more demanding phase anticipated about summer 1971. The conceptual design involved leaves all processing personnel but a few clerks at the local institutions.

Estimated Computer costs: $192,000 per year for Phase I, with a relatively modest file of 200 million characters anticipated in direct-access storage; costs for Phase II probably in excess of $400,000 per year, with files exceeding a billion characters in Phase II. Phase II requires a second CPU.

Estimated Software costs: not less than a total of $300,000 in software costs will have accumulated by the first several years of Phase II.

Estimated calendar time: from funding to the operational status for Phase I required 2.5 years;

Phase II, which is comparable to the system concept being examined, will require at least another 1 to 1.5 for the first subsystems. Careful examination of library realities and a willingness to avoid rushing into glamorous but costly projects has made rapid and successful progress possible so far for this project. A funding crunch, now approaching, may hazard the previous success of this project.

Project E: <u>A very large research library with national responsibilities across many disciplines.</u>

This project was conceived following the extended exploratory analysis in 1961-62 by a blue-ribbon team almost entirely composed of non-librarians, and has been managed from the funding of the project by experienced computer specialists without library experience. A major systems contractor assisted for two years with the analysis and design phases of the project, which uncovered unsuspected major problems.

The conceptual design requires two or three medium-to-large CPU's and at least several billion characters of direct-access storage.

Estimated Computer costs: no reliable estimate can be given since the original conceptual design has been abandoned.

Estimated Software costs: $5.2 million has been spent during the period 1966-1970; it appears a at present several times as much will be required.

Estimated Calendar time: the project was originally estimated as requiring six years when in the hands of an external systems contractor. It is now two years behind that schedule, and is currently in the hands of the third major software contractor; the project has also had specialized technical participation by about two dozen other software contractors; and the library's own in-house systems staff had been led and dominated by non-librarians.

Project F: A large academic library with more than 2 million volumes.

The conceptual design calls for a crude type of computer catalog access to a file exceeding 900,000 titles initially, but with the early subsystems concentrating on circulation control rather than processing routines.

Estimated Computer costs: $500,000 per annum; costs are fairly firm '69 estimates, and include several dozen inquiry terminals with modest capabilitites.

Estimated Softward costs: $400,000; estimates are by the manufacturer's software staff, conducting

the development, and are not exactly firm.

Estimated calendar time: 1.5 years from funding to planned operational capability. The goal may be achieved since involvement with processing considerations has been rigorously avoided, but at the cost of an expensive duplication of record conversion several years hence, since the record format being used is not adequate for most catalog access users, and is probably not capable of locating by reasonable means more than about 80 per cent of the records actually in the file.

Development costs for what may be considered as Phase I of the project have now passed $300,000 with annual Hardware costs of $150-200,000 a reasonable estimate. Hardware costs have been kept down by concentrating most inquiry traffic at a single 6-station set of inquiry consoles, with user access by telephone via an intermediary operator.

The project has some justification in the existence of an antique and overworked central library building with an excessive number of branch libraries but actual funding of the project has been dictated by the political needs of a new "Learning Resources" organizational structure including the library, the new organization apparently being able to achieve funding for show projects.

Project G: A large academic library with approximately 4 million volumes.

The cost estimates for the project, located at a large and wealthy private university, have been developed carefully over the first three years of the project, which has had active and substantial participation by the university's outstanding computer center. Conceptual design for the system gives on-line query capabilities at first to staff only, with users of the library being limited to card catalogs of the usual kind for some years yet, although these catalogs will be maintained in part by computer supported activity. Economic justifications for the project offered formally justify the project in terms of long-range assumptions concerning library growth, salary trends, etc., rather than present or near-future costs.

No cost estimates are available for data conversion, and the university has not committed itself yet to a complete retrospective data conversion. The costs involved clearly make it reasonable and prudent to gamble that the Library of Congress and other sources will assist with the task over the development period.

Estimated Computer costs: $500,000 per annum by 1971, and thereafter rising slowly as file

requirements grow.

Estimated software costs: $1.5 million in direct costs over the development period.

Estimated calendar time: 5-8 years, approximately 1967-1975. Some subsystems using direct query methods are expected to be put into operation by the end of 1971.

APPENDIX E*

LIST OF DESIRABLE PRODUCTS AND SERVICES FROM THE JOINT AUTOMATED SYSTEM OF THE THREE NATIONAL LIBRARIES, AND COMPATIBILITY PROBLEMS ASSOCIATED WITH EACH

PRODUCTS AND SERVICES	COMPATIBILITY PROBLEMS											
	1. Data Formats	2. Standard Coding	3. Character Sets	4. Machine File Structures	5. Filing Rules	6. Cataloging Practices	7. Terminology	8. Transliteration	9. Data Conversion	10. Communication Links	11. Provision for Others' Use	12. Output Requirements
I. Book catalogs (off-line)	x	x	x		x	x	x	x	x			x
II. Catalog cards (off-line												
A. Full	x	x	x			x	x	x	x			x
B. Tailored	x	x	x			x	x	x	x		x	x
III. Machine-readable cataloging data	x	x	x			x	x	x	x	x	x	
IV. Bibliographies (demand or recurring)	x	x	x	x	x	x	x	x	x	x	x	x
V. Location of information on specific bibliographic items (on-line)												
A. Within one or more nat'l libraries												
1. Processed	x	x	x	x		x	x	x	x	x	x	
2. In process	x	x	x	x		x		x	x	x	x	
3. Desiderata	x	x	x	x		x		x	x	x		
B. Within other libraries	x	x	x	x		x	x	x	x	x	x	
VI. Coordination of cataloging activity												
A. Consultation of name authority file (on-line)	x	x	x	x		x		x	x	x	x	
B. Consultation of subject headings file (on-line)	x	x	x	x		x	x	x	x	x	x	
C. Provision of information on cataloging practices	x	x	x	x		x	x	x	x	x		x
D. Coordination of classification	x	x		x		x	x		x	x		
VII. Coordination of acquisitions activities												
A. Information on exchange partners and dealers	x	x	x	x				x	x	x	x	x
B. Lists of acquisitions in subject areas	x	x	x	x	x			x				x
VIII. Coordination of reference services												
A. Automatic interlibrary loan requests	x	x	x	x		x		x	x	x		x
B. Information on non-bibliographic sources of information (on-line)	x	x		x			x		x	x	x	
IX. Provision of statistics on performance and use of the system	x	x		x			x					x
X. Information on the system for other libraries												
A. Common codes											x	x
B. Common data formats											x	x
C. Common character sets											x	x
D. Equipment used by the system											x	x
E. Programs											x	x
1. System programs									x		x	x
2. Conversion programs									x		x	x

*Library of Congress Information Bulletin, November 30, 1967, p. 800. Attachment 1.

APPENDIX F

COMMUNICATIONS COSTS AND DESIGN ELEMENTS IN THE MEGASYSTEM
--brief by Duncan Wall for the IPCUR Project--

In the absence of an actual set of system requirements, which would have as major parameters both the size and organization of the data base and the query load it is expected to service, communications costs for the 'catalog inquiry data subsystem' must remain rather indeterminate. That is the usual status with studies at the small scale of this one, where only rather approximate estimates based upon personal experience and interpretation are possible. In any case, even if IPCUR were to attempt the kind of major cost/feasibility study of the kind done at LC and now beginning in California, technical progress in the communications field is perhaps even more rapid and unpredictable than in the computer field, and the most responsible of estimates made at this point could be obsoleted rather rapidly during the three-to-five year period it would require to bring the catalog data subsystem into operation.

It is a rather common estimating convention during this phase to make an interim estimate, using the costs associated with a rather simple design based upon arrangements such as leased lines at the usual tariffs, or one of the dialup services offered for timesharing purposes. When an actual design is attempted, in the light of detailed system requirements, costs thus estimated will usually be found to be within the previous estimate, with

user service and response time being somewhat better than presumed in the original estimates. The process of making this kind of estimate usually requires a fair amount of familiarity with the characteristics of the traffic.

A cost of about $110,000 a year can be used as provisional estimate for recurring costs if this kind of estimating technique is used here. The effect upon costs of a totally different technical communications situation--e.g. the creation of an extensive broadband network dedicated to the universities or research and based upon satellite or waveguide technology is essentially impossible to predict within the terms of the study.

However, it should remain clear that communications costs associated with the catalog inquiry subsystem would remain one of the simpler and least expensive components of the cost equation for that subsystem. For this reason other factors in the system acquisition process will assume the character of the decisive role.

There is, of course, a second prominent role of telecommunications in the megasystem, involving the potential use of telefacsimile in physical delivery of materials. There is very little doubt that over the next five years facsimile transmission among the participant libraries might assume a very useful role, although at present the impact of this increased use would be more as an improvement in services than as a delivery on dividends from the resource-management subsystem. Here we encounter this

characteristic naivete encountered in physical scientists and many others, where the retrieval and delivery of known items is used as a model for the entire informational process served by the research and academic library, without recognition of the extensive use of these libraries outside the known-item mode. Large returns are consequently anticipated from the 'necessary duplication' imagined to be eliminated by the resource-management subsystem. Someone should tell them that world book production is now above 500,000 titles a year and increasing at a steady 5 per cent per year. The information should help them better to put into some kind of reasonable order of magnitude the kind of modest effort mounted by the typical 'large research library.'

The most optimistic estimate which can be made concerning the potential use of telefacsimile is entirely dependent upon major improvements in the 'catalog data' subsystem, which will have to be brought into existence first. As a simple matter of staging, the potential of telefacsimile is nearly irrelevant at present: in a similar way, major improvements in physical delivery by interlibrary loan, interloan and other physical materials traffic are heavily dependent upon improvements in the catalog data system and the 'library business' data systems dependent upon it. What we have here is a relatively simple decision/development tree, the critical path of which runs through the basic systems planning tasks

preceding the development of the computer-based catalog data system. It would be a very serious mistake for the universities collectively to mistake the high value which their faculties and students would probably place upon direct physical access to their research materials not only outside the known-item-retrieval situation, but outside the catalog lookup one as well. In any event, planning for the megasystem which does not include a sufficient appreciation by local research communities of their local and immediate needs for physical access to their materials, will inevitably be illusory in results.